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Diurnal variation of aerosol optical depth and angstrom exponent from Geostationary Ocean Color Imager (GOCI) Yonsei AErosol Retrieval (YAER) algorithm

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Diurnal variation of aerosol optical depth and Angstrom exponent from Geostationary Ocean Color Imager (GOCI) Yonsei AErosol Retrieval (YAER) algorithm
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Over the East Asia, aerosol optical properties (AOPs) can be changed very quickly and diversely during a day because mineral dust or heavy anthropogenic aerosol events occur sporadically and frequently. When severe aerosol event occurs from source region, long-range transported can be appeared over East Asia within one day so that multi-temporal satellite observation during a day is essential to detect aerosol diurnal variation in East Asia. Although it has been possible from previous meteorological sensors in geostationary earth orbit, only aerosol optical depth (AOD) at one channel can be retrieved and accuracy of retrieved AOD is worse than those of multi-channel sensors such as MODIS, SeaWiFS, or VIIRS because appropriate aerosol model selection is difficult using single channel information.
The Geostationary Ocean Color Imager (GOCI) is one of sensor onboard COMS geostationary satellite. It has 8 channels in visible, which are similar with SeaWiFS and MODIS ocean color channels. It observes East Asia, including East China, Korean Peninsula, and Japan, hourly during the daytime (8 times observation in daytime). Because of geostationary and multi-channel characteristics, accurate AOPs such as AOD and Angstrom exponent (AE) can be retrieved from GOCI Yonsei Aerosol retrieval (YAER) algorithm as high spatial (6 km x 6 km) and temporal (1 hour) resolution.
In this study, GOCI YAER AOD and AE are compared with those from AERONET (ground-based observation) and MODIS Collection 6 Dark Target and Deep Blue algorithm (satellite-based observation) as high frequency time series during a day and few days over AERONET sites. This can show the accuracy of GOCI YAER algorithm in compare with AERONET. In specific transport cases such as dust or haze, instantaneous increase of AOD and change of aerosol size from AE can be also detect from GOCI. These GOCI YEAR products can be used effectively as input observation data of air-quality monitoring and forecasting.